

CLAIMS

What is claimed is:

1. An integrated circuit package comprising:

a substrate having a first surface and a second surface;

a die pad area, disposed on said first surface, said die pad area having dimensions suitable to mount an integrated circuit thereon;

a first thermally conductive structure disposed at least partially around said die pad area on said first surface;

a second thermally conductive structure underlying said first thermally conductive structure and disposed on said second surface;

a first plurality of thermally conductive bars on said first surface that radiate outwardly from the die pad area and that are thermally coupled to said first thermally conductive structure;

a second plurality of thermally conductive bars on said second surface underlying the first plurality of bars and that are thermally coupled to said second thermally conductive structure; and

a plurality of thermally conductive vias, at least one of the vias coupled between said first and second thermally conductive structures for providing thermal conductivity from the first surface of the substrate to the second surface of the substrate,

wherein each of the plurality of thermal bars conduct thermal energy from the die pad area to an associated one of said first thermally conductive structure and said second thermally conductive structure.

2. The integrated circuit package of claim 1, further comprising:

a plurality of signal balls disposed on the second surface of the substrate and outside the die pad area, at least one of the plurality of signal balls being in thermal contact with an associated one of the plurality of vias, and at least one of the plurality of signal balls being adapted to conduct thermal energy.
3. The integrated circuit package of claim 1, wherein the substrate is thermally coupled to a printed wiring board and the thermal energy is dissipated from the die pad area to the printed wiring board through said first and second thermal bars.
4. The integrated circuit package of claim 1, further comprising an integrated circuit disposed on the die pad area.
5. The integrated circuit package of claim 1, where the plurality of thermal bars are electrically isolated from a plurality of electrically signal conveying vias disposed between said first and second surface.
6. The integrated circuit package of claim 1, wherein the plurality of thermal bars comprise a thermally conducting material that is tangibly and thermally continuous with a thermally conductive material that comprises said thermally conductive structure.
7. A method for dissipating thermal energy from a die pad comprising:

providing a substrate having a first surface and a second surface, a die pad area, disposed on said first surface, said die pad area having dimensions suitable to mount an integrated circuit thereon;

providing a first thermally conductive structure disposed at least partially around said die pad area on said first surface and a second thermally conductive structure underlying said first thermally conductive structure and disposed on said second surface;

thermally coupling a first plurality of thermally conductive bars on said first surface that radiate outwardly from the die pad area to said first thermally conductive structure;

thermally coupling a second plurality of thermally conductive bars on said second surface underlying the first plurality of bars to said second thermally conductive structure;

conveying thermal energy using a plurality of thermally conductive vias, at least one of the vias coupled between said first and second thermally conductive structures for providing thermal conductivity from the first surface of the substrate to the second surface of the substrate, and

transferring thermal energy, using the plurality of thermal bars to conduct thermal energy from the die pad area to an associated one of said first thermally conductive structure and said second thermally conductive structure.

8. The method of claim 7, further comprising:

providing a plurality of signal balls disposed on the second surface of the substrate and outside the die pad area, at least one of the plurality of signal balls

being in thermal contact with an associated one of the plurality of vias, and at least one of the plurality of signal balls being adapted to conduct thermal energy.

9. The method of claim 7, further comprising thermally coupling the substrate to a printed wiring board such that the thermal energy is dissipated from the die pad area to the printed wiring board through said first and second thermal bars.
10. The method of claim 7, further comprising an integrated circuit on the die pad area.
11. The method of claim 7, further comprising electrically isolating the plurality of thermal bars from a plurality of electrically signal conveying vias disposed between said first and second surface.
12. The method of claim 7, further comprising:
fabricating the plurality of thermal bars from a thermally conductive material that is tangibly and thermally continuous with a thermally conductive material that comprises said thermally conductive structure.